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Young Adults' Skills Gain in the International Survey of Adult Skills 2012

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Authors and acknowledgements

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Acronyms

GCSE	General Certificate of Secondary Education
IALS	International Adult Literacy Survey
ISCED	International Standard Classification of Education
OECD	Organisation for Economic Co-operation and Development
PIAAC	Programme for the International Assessment of Adult Competencies
PISA	Programme for International Student Assessment

Executive Summary

The OECD Survey of Adult Skills (part of the Programme for the International Assessment of Adult Competencies, PIAAC) found that young people in England, aged between 16 and 24, have particularly poor skills in literacy and numeracy compared with the average skills of 16-24 year olds in other participating OECD countries. The proficiency in each skill varies with age and when the performance of adults grouped by 10-year age bands is compared, there is a pattern of improved performance up to adults in their mid-thirties and then a decline in skills levels as adults approach retirement. This report investigates how and why young adults' literacy and numeracy skills continue to improve after completing formal education. It aims to establish whether improvements in performance are related to a natural improvement and decline in literacy and numeracy skills with age or whether the pattern observed is related to specific educational or employment experiences that different age bands have had.

The performance of young adults in the Survey of Adult Skills can be compared with performance of young adults in other international surveys in which England has participated. England participated in the International Adult Literacy Survey (IALS) in 1996. The data from the two surveys means that it is possible to make comparisons between the literacy skills of adults who were the same age in each survey, to look at a cohort effect, and to compare the performance of adults who were aged 16-24 in IALS with adults aged 32-40 in the Survey of Adult Skills, to look at the ageing effect. Results from England's participation in the Programme for International Student Assessment (PISA), which assesses reading and mathematics skills of 15-year-olds, means that comparisons can also be made between the performance of pupils in England in PISA 2006 and PISA 2009 in reading and mathematics and the literacy and numeracy skills of young adults who participated in the Survey of Adult Skills who would have been 15 at the time of the PISA surveys.

While the OECD's analysis showed that in most countries people around the age of 30 had the highest literacy skills in 2012, comparisons between IALS (1996) and the Survey of Adult Skills (2012) found a significant gain over time in the literacy scores of adults between age 16 (in IALS) and 32 (in the Survey of Adult Skills) (i.e. a positive ageing effect) in England and only five other countries. In the other countries for which this change over time analysis was possible, literacy proficiency tends to peak soon after the end of formal schooling and then declines. When adults in the same age groups are compared between the two surveys (e.g. the adults in the Survey of Adult Skills aged 16-24 compared with the adults aged 16-24 in IALS - a cohort effect), only the adults aged 55-65 have a significant difference in scores between the two surveys. As there is no significant difference in scores for adults aged 16-24 or 25-34 between the two surveys, there is no evidence that adults aged 16-24 today have received a different quality of education compared with those in the mid-1990s. From the ageing and cohort comparisons, we might conclude that the skills levels that young adults in England reach at the end of formal schooling are insufficient for everyday life and work and so they are required to continue to improve on these skills through further education and training in higher education, or when they enter work.

Evidence from PISA shows that England moves from an average position in the PISA assessments of reading and mathematics to a bottom ranking position in the Survey of

Adult Skills assessments of literacy and numeracy in late teens and a just above bottom ranking position in their early twenties. Young people in other countries make far more progress in literacy and numeracy than is seen in England between these ages.

There is further evidence of a gap between the skills of young adults when they leave compulsory education and the skills they require in the workplace. This report shows that continuing beyond compulsory education was related to higher levels of skills and that young adults (aged 16-24 years old) in England who were in employment had literacy and numeracy scores not significantly different from the average of participating OECD countries. However, young adults in education and work programmes performed significantly below the international average. While young people's literacy level and improvement is limited relative to other countries, the PISA comparison with the Survey of Adult Skills indicates some improvement between 18 and 21 within England. People's skills seem to improve more rapidly in their twenties, with 25-34 year olds in England being similarly skilled to counterparts in other countries. This suggests that a combination of continuing beyond compulsory education and entering the world of work help raise young people in England's skill levels in literacy and numeracy to around the average of participating OECD countries.

1. Introduction

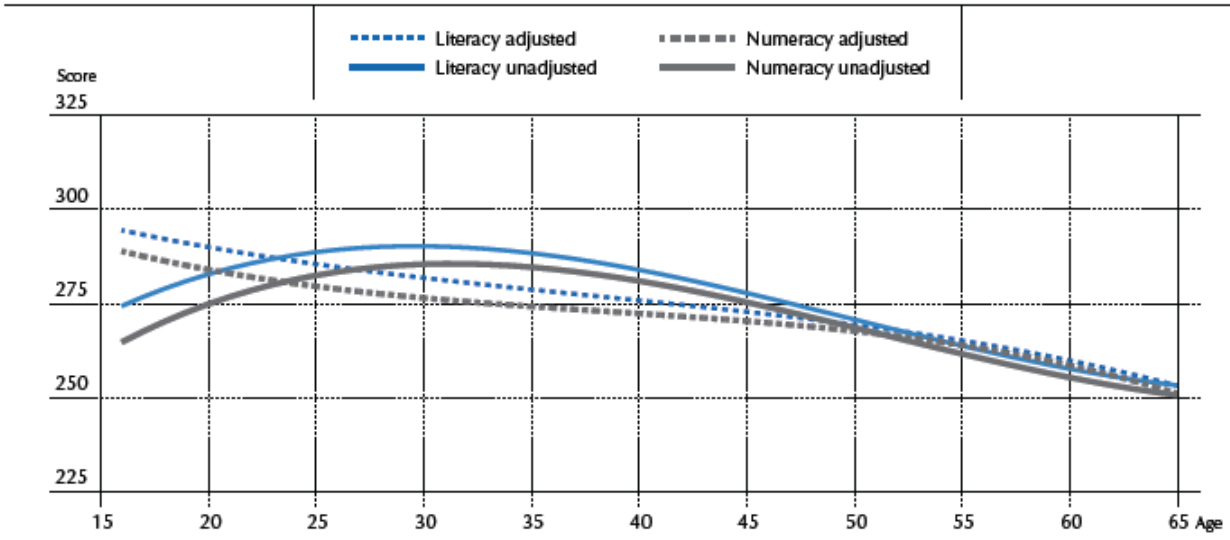
This report provides further analysis of the performance of young adults in England in the OECD's Survey of Adult Skills to complement key messages already published in the national and international reports, published on 8 October 2013 (Wheater *et al.*, 2013c and OECD, 2013b, respectively).

The Survey of Adult Skills assessed the performance of working age (16-65 year old) adults in literacy, numeracy and problem solving in a technology-rich environment (shortened throughout this report to 'problem solving'). In this report we focus on the literacy and numeracy skills of young adults in England. In particular, we aim to answer the research question:

How and why do the literacy skills of young adults in England continue to improve after completing formal education?

Although the survey is not longitudinal, the profiles of literacy and numeracy by age, across all participating countries, suggest that adults' skills continue to improve into their thirties. Figure 1.1 below shows this relationship for the average scores by age when adults from all participating countries are considered. This pattern is also observed in England, where the age band with the highest literacy score is 25-34 year-olds and the highest numeracy score is 35-44 year-olds.

Figure 1.1 The average relationship between skills proficiency and age in the Survey of Adult Skills



Source: OECD 2013b: figure 5.2a

Note: average scores by age, adjusted for educational attainment and language background, foreign born adults excluded. Russian data is not included in the analysis.

In order to answer the research question, this report:

- makes comparisons (in section 2) between the literacy levels of adults in England at the time of the International Adult Literacy Survey (IALS) in 1996 (Carey *et al.*, 1997) with the more recent picture of literacy levels in England from the OECD Survey of Adult Skills in 2012. In this comparison, particular focus is put on the adults who would have been included in the target population for both studies, to ascertain whether the observed improvement of adults' literacy skills during their twenties is an age-related or a cohort effect. The findings for England are compared with the equivalent analysis for all countries that participated in both studies. Comparisons are also made of the literacy and numeracy skills of participants in the OECD Programme for International Student Assessment (PISA) survey and the Survey of Adult Skills. It should be noted that comparisons of participants between surveys are not of the same people, but of samples of people who are deemed to be equivalent.

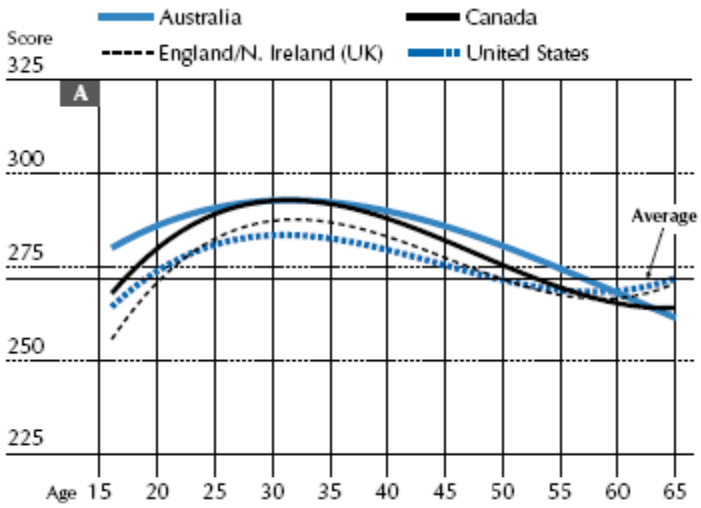
- compares (in section 3) the associations between proficiency and: additional years of education; employment; and skills use, by age band to identify possible reasons for the observed profile of literacy and numeracy skills by age.

2. Comparisons with results from other international surveys

2.1 Introduction

In England, the OECD Survey of Adult Skills found a pattern of improved literacy proficiency with age for adults up to the their twenties and thirties followed by a decline until around age 55. Figure 2.1 shows the average literacy proficiency, by age for England, Australia, Canada and the United States. A similar pattern is observed in most participating countries.

Figure 2.1 Average literacy proficiency of adults in England, by age compared with Australia, Canada and the United States (foreign-born adults excluded)



Source: OECD 2013b: figure 5.2b (L) A

There are three possible explanations for this pattern of improvement followed by decline with age:

(i) It may be that when young adults leave formal education, enter further education or the world of work and are responsible for the day-to-day activities in running their lives, such as job searching and completing forms (such as opening a bank account or renting a property), their literacy skills improve rapidly. This may then be followed by a natural decline with age. This decline would not necessarily be the same in all countries as it may depend on the types of jobs that adults do as they age and the age of retirement in each country.

(ii) Or, it may be that adults in their early thirties experienced a particularly good formal education with relatively high outcomes and their high scores are a result of this – a cohort effect.

(iii) Thirdly, the observed pattern seen in the data may be a combination of the two factors.

In order to establish how much of this effect is related to life experience and ageing and how much is a factor of the different experiences of adults going through the formal education system at different times, this chapter makes comparisons between the observed skills profile by age as observed in the Survey of Adult Skills (2012) with England's results in the International Adult Literacy Survey (IALS, 1996) and with 15-year olds' performance in the Programme for International Student Assessment (PISA, 2006-2012).

2.2 Comparisons with the International Adult Literacy Survey

England participated in the International Adult Literacy Survey (IALS) in 1996 and in the Survey of Adult Skills in 2011-2012. IALS assessed the skills of adults in prose, document and quantitative literacy. The skills assessed in prose and document literacy are similar to those of literacy in the Survey of Adult Skills and therefore comparisons can be made between the performance of adults in IALS and the Survey of Adult Skills in literacy. Some of the questions assessing document and prose literacy in IALS were also included in the Survey of Adult Skills. The skills assessed in quantitative literacy in IALS do not have sufficient overlap with those assessed in numeracy in the Survey of Adult Skills and therefore a comparison between these surveys of numeracy skills cannot be made. IALS did not assess problem solving skills (see OECD, 2013c, for further details).

Both surveys were sampled in a similar way, to be nationally representative of the working age adult population in England. Two types of comparison can be made between the literacy scores of adults across this age range, captured in these two surveys, to compare the effects of different experiences of education and work of different generations:

1. A comparison between the literacy scores of **adults of the same generation** in each of the two surveys, i.e. those adults that were 16 in IALS with those that were 32 in the Survey of Adult Skills (ageing effect);

2. A comparison between the literacy scores of **adults of the same age** in the two surveys (cohort effect).

The following section builds on information in the OECD Survey of Adult Skills international report (OECD, 2013b, pp.195–198), which compares ageing and cohort effects on literacy proficiency for six countries that participated in the two surveys, making additional comparisons for all countries where comparable data by age is available.

It is not possible to replicate the OECD analysis from the international report with the IALS population (OECD, 2013b, pp.196–197) because the internationally available data from IALS is in 10-year age bands, rather than the continuous data required to replicate the smooth graphs produced by OECD from the Survey of Adult Skills. There are also limitations with some of the data from the Survey of Adult Skills due to the suppression of some variables on the internationally released datasets for some countries.

The following analysis was carried out for all countries that participated in both IALS and the Survey of Adult Skills that have publicly available data.[1] As was the case for the analysis carried out in the international report, foreign born adults were excluded. This is because the proportion of foreign born adults has changed significantly in many countries since IALS and as this group performs significantly below adults born in each country, including these adults makes it difficult to disentangle the effects over time and complicates the implications that can be drawn from the analysis. It is also worth noting that while the ageing effect is compared between IALS and the Survey of Adult Skills, the interviews were not conducted with the same people, so it is a 'pseudo-cohort' analysis, rather than a longitudinal assessment of the same cohort.

Figure 2.2 below compares the difference in the mean scores of adults in England aged 16-24 in IALS and the same generation 16 years later in the Survey of Adult Skills, aged 32-40. It does not show the actual scores, but the differences between them. The capped black line shows the 95 per cent confidence interval of the difference: if the line overlaps with zero then the difference is not statistically significant.

In England, the cohort of adults who were aged 16-24 in IALS has significantly improved their literacy skills when assessed at age 32-40 in the Survey of Adult Skills. This finding supports the hypothesis that the increase in literacy proficiency between adults aged 16 and adults aged 30-35 (shown in Figure 2.1) may be due to skills-gain following the end of compulsory education and into adults' early thirties.

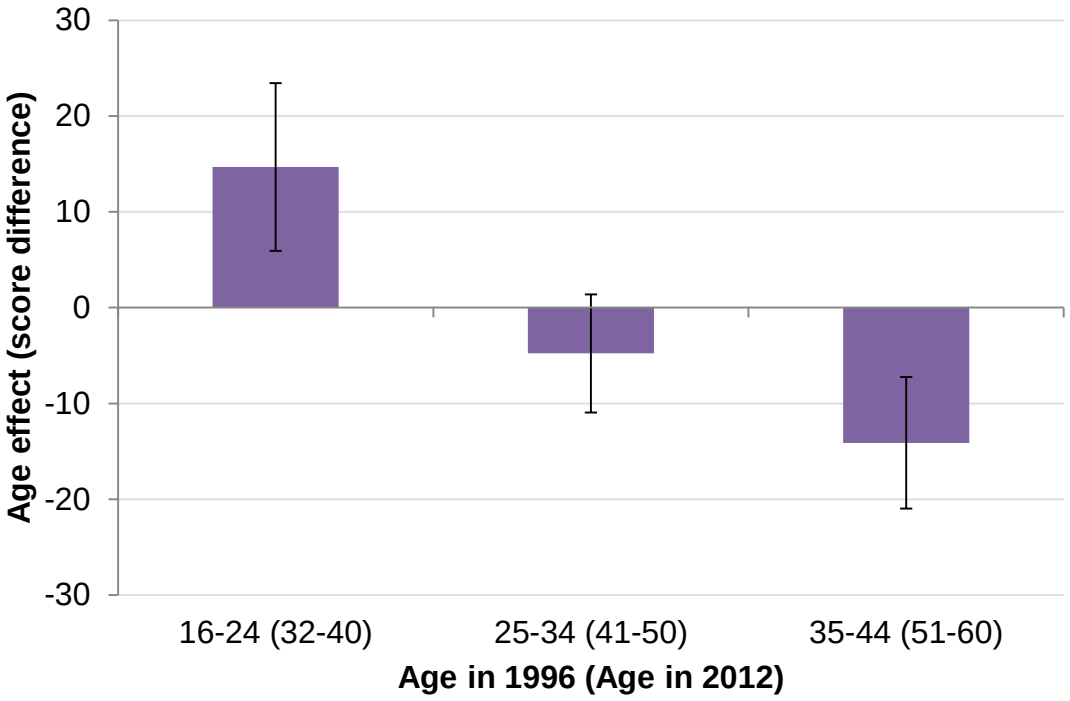
In contrast, adults in England who were aged 25-34 in IALS and their counterparts aged 41-50 in the Survey of Adult Skills performed at a similar level of literacy proficiency, supporting the hypothesis that adults in England do not significantly improve their literacy proficiency past the age of 30.

Conversely again, adults who were aged 35-44 in England during the IALS survey performed significantly better than adults of the same cohort aged 51-60 in the Survey of Adult Skills, which supports the hypothesis that adults' literacy skills deteriorate after the age of 40.

The first of these findings for England (significant literacy skills gain between age 16 and 30) is only mirrored in five other countries for which this analysis is possible. In Australia and Poland, a similarly sized score point improvement is observed for this age group. In Finland, Northern Ireland and the Netherlands, a significant but smaller improvement in literacy proficiency is observed for this age group. In the other countries for which this analysis was possible, literacy proficiency tends to peak soon after the end of formal schooling and then declines. It is worth adding, however, that in 2012 literacy levels peaked at around age 30 in most countries (see OECD, 2013b, figure 5.2c (L)). This finding does not contradict the IALS comparison finding, but suggests that the current peak age in most countries is not (only) driven by age-related changes in literacy (see figure 2.4).

[1] Australia, Belgium (Flanders), Czech Republic, Denmark, England, Finland, Ireland, Italy, Netherlands, Northern Ireland, Norway, Poland, Sweden.

Figure 2.2 Literacy skills loss/gain due to ageing in England (adults born outside the UK excluded)



Note: The capped black line shows the 95% confidence interval of the difference: if the line overlaps with zero then the difference is not statistically significant.

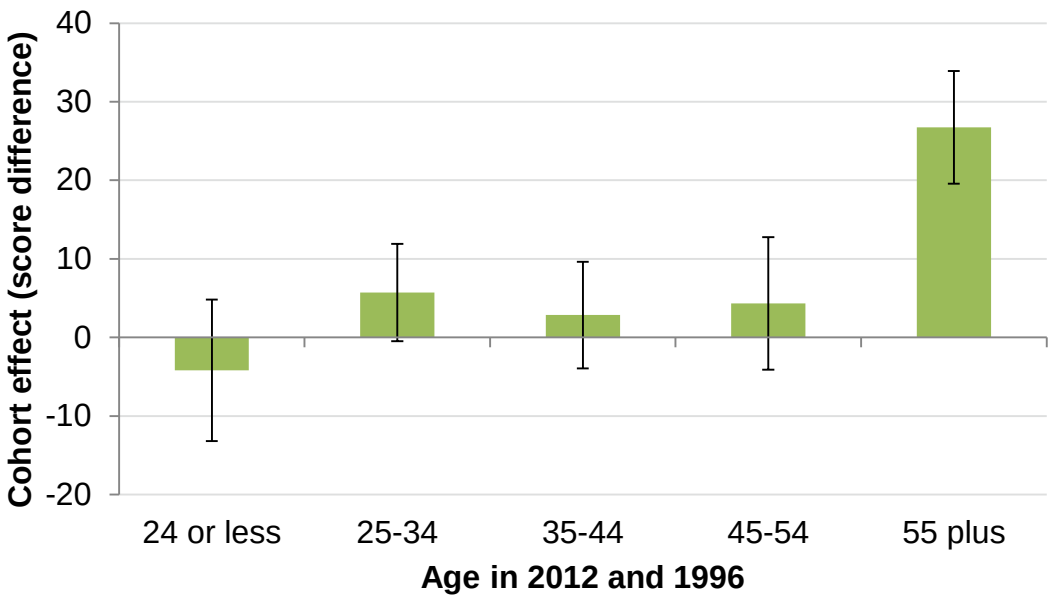
Source: Survey of Adult Skills (2012); IALS, 1996

This pattern of improvement supports the theory that there is greater skills gain in England following the completion of compulsory education than in many other countries. This difference in pattern with other countries may suggest that it is not solely an age effect and on-going life experiences that leads to the gains, as it could be hypothesised that this would be replicated across the countries. Instead, we might conclude that the skills levels that young adults in England reach at the end of compulsory schooling are insufficient for everyday life and work and so they are required to continue to improve on these skills through further education and training in higher education or when they enter work (this skills gain continues into their thirties).

The age at which most young people complete their formal schooling is likely to impact on their literacy and numeracy levels. The age at which compulsory education is completed and the age at which most young people leave school varies amongst participating countries. In England in 2011, 16 was the ending age of compulsory education, matching the average of participating OECD countries. In addition, the age range at which over 90 per cent of the population was enrolled in education was between 4 and 16, which also matches the OECD average (OECD, 2013a; Table C1.1a, p. 269). Except for Australia and Austria, all countries whose 16-24 year olds had an average literacy score similar to or above the OECD average in the Survey of Adult Skills had 90 per cent of the population enrolled in public or private institutions until the age of 17 or 18.

Figure 2.3 compares the differences in mean score of adults who were in the same age group in each survey (e.g. the adults in the Survey of Adult Skills aged 24 or less compared with the adults aged 24 or less in IALS). The youngest age group have on average a lower score in the Survey of Adult Skills that in IALS, but this difference is not significant. Only the scores of adults aged 55-65 significantly improved between the two surveys. These findings suggest that, except for the oldest age cohort, the quality of education received by the different cohorts and the effect of their life experiences post-education had a similar effect on skills in 1996 and 2012.

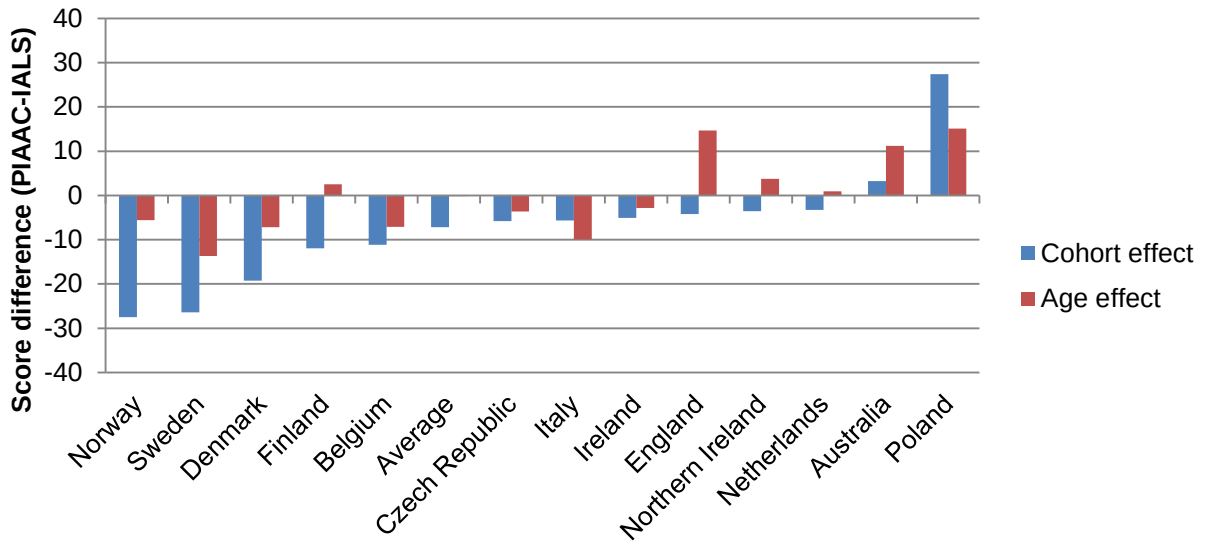
Figure 2.3 Effect of belonging to a certain age group (cohort effect) on literacy proficiency in England (adults born outside the UK excluded)



Note: The capped black line shows the 95% confidence interval of the difference: if the line overlaps with zero then the difference is not statistically significant.

Source: Survey of Adult Skills (2012); IALS, 1996

Figure 2.4 Age and cohort effect on literacy scores for young adults in IALS and the Survey of Adult Skills (foreign born adults excluded)



Note: The cohort effect (blue bar) shows the difference for adults aged 16-24 in IALS and adults aged 16-24 in the Survey of Adult Skills. The age effect (red bar) shows the difference for adults aged 16-24 in IALS and adults aged 32-40 in the Survey of Adult Skills. The score difference is measured against the average for each of the countries included in the table.

Source: Survey of Adult Skills (2012); IALS, 1996

Figure 2.4 summarises the age and cohort effects for young adults that participated in

IALS and the Survey of Adult Skills for which comparable data are available. The red bars (right-hand bar for each country) show the data for the population that was 16-24 in IALS and 32-40 in the Survey of Adult Skills (the age effect). The blue bars (left-hand bar for each country) show the data for 16-24 populations from IALS and the Survey of Adult Skills (the cohort effect). The data shows that the age-related improvement for young people in England is relatively unusual. Based on this analysis, we expect the young adults in England who participated in the Survey of Adult Skills to improve their literacy skills, whereas in many other countries their young adults are predicted to decline over the next 16 years.

Particularly striking in the summary of young people's performance is the performance in Scandinavian countries. Denmark, Finland, Norway and Sweden have declined the most when 16-24 year olds in the Survey of Adult Skills are compared with IALS. However, despite this decline, all of these countries are still ranked above England in terms of their average literacy score for 16-24 year-olds in the Survey of Adult Skills.

2.3 Comparisons with the Programme for International Student Assessment

The OECD Programme for International Student Assessment (PISA) was first run in 2000. Since then, it has been carried out on a three-year cycle. PISA assesses the reading, mathematics and science skills of pupils aged 15. Pupils are assessed on their competence to address real life challenges involving each of these subjects, rather than their mastery of the curriculum. Although PISA reading and mathematics is not the same as literacy and numeracy assessed in the Survey of Adult Skills, there is some overlap. (See OECD, 2013c, pp.86-91 for further details on the relationship between the two surveys.)

The pupils assessed in PISA are selected to be representative of 15-year-olds in education in each participating country. It is therefore possible to compare the performance of pupils assessed in PISA with the equivalent cohort in the Survey of Adult Skills, in a similar way to the age effect comparisons made above between the Survey of Adult Skills and IALS. England has participated in every round of PISA since 2000. However, problems with the response rates in 2000 and 2003 mean that estimates of mathematics and reading performance in these years are considered unreliable. Therefore, comparisons with data from 2000 or 2003 for England are not possible. Figures 5.6a and 5.6b in the international report (OECD, 2013b, pp. 206–207) show the comparison of results in PISA reading with the Survey of Adult Skills literacy for all countries that have participated in each round for which OECD publishes data. These charts are replicated in the appendix, Figures A1 and A2. Figures A3 and A4 replicate this analysis to compare performance in PISA mathematics and numeracy in the Survey of Adult Skills.

In the 2006 and 2009 PISA assessments, 15-year olds in England performed around the average of participating OECD countries in both reading and mathematics. The latest PISA 2012 survey also found that pupils in England have continued to perform similarly in all subjects (Wheater *et al.*, 2013a). Therefore, there is no evidence of a decline in the standard of education experienced by young people to age 15 (no cohort effect). However, the performance of these PISA cohorts in the Survey of Adult Skills (the PISA 2006 and 2009 cohorts were aged 21 and 18 in the Survey of Adult Skills, respectively) was poor compared to the performance of young adults of the same age in other countries. The scores of 18 year olds (who would have been 15 in 2009) were poorer in the Survey of Adult Skills than the scores of 21 year olds (15 in 2006). With only two data points, it is impossible to see a trend, but this is the same for both domains and therefore it might be concluded that literacy and numeracy skills in England improve slightly between the age of 18 and 21. However, gains in literacy and numeracy proficiency amongst young adults in their late teens in other countries are much greater, leaving young adults aged around 20 in England with the worst skill levels amongst participating countries. Compared with other countries, young people in England make less progress in their skill levels between age 15 and their late teens/early 20s. England move from an average position in the PISA assessments of reading and mathematics to a bottom position in the Survey of Adult Skills assessments of literacy and numeracy in late teens and a just above bottom position in their early 20s.

While young people's literacy level and improvement is limited relative to other countries, the PISA results indicate some improvement between 18 and 21 in England. People's

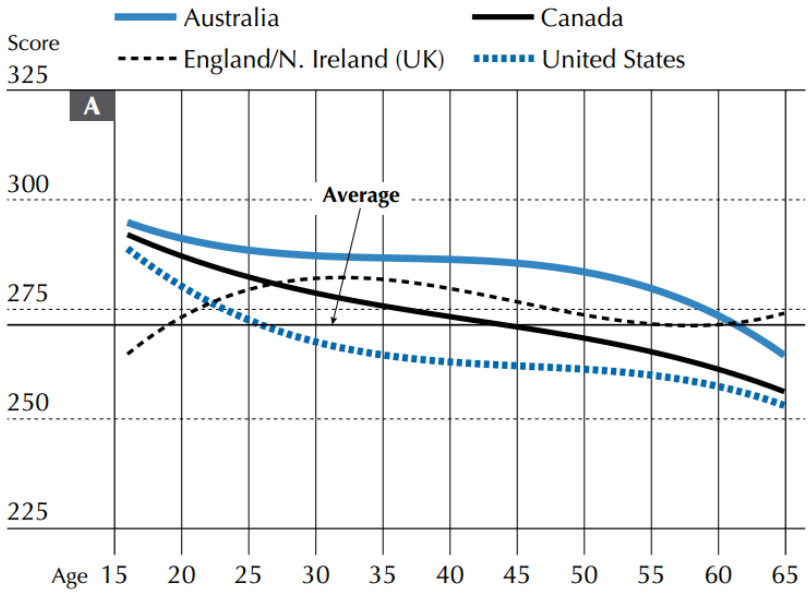
skills seem to improve more rapidly in their twenties, with 25-34 year olds in England being similarly skilled to counterparts in other countries (see Wheater *et al.* 2013b: table 2.10). This suggests that a combination of continuing beyond compulsory education and entering the world of work help raise young people in England's skill levels in literacy and numeracy to around the average of participating OECD countries.

3. Factors associated with skill level

Building on the age-profile analysis in chapter 2, this chapter considers the question: can the age profile of literacy and numeracy skills be explained by a change in the factors significantly associated with skill level, for example years' of education, or highest qualification held?

In the international reports, the relationship between age and absolute attainment was investigated further by controlling for a number of background variables (OECD, 2013b, Table A5.2). The following graph from the report shows that the UK (England and Northern Ireland[2]) is the only English-speaking country in which literacy proficiency continues to rise with age for young people once educational attainment and language background are adjusted for. Indeed, amongst all participating countries, only in Norway is the same also true.

Figure 3.1 Relationship between literacy proficiency and age (adjusted for education and language background, foreign born adults excluded)



Source: OECD 2013b, fig 5.2c (L) A

The chart above indicates that there are other factors besides education that strongly influence skill levels between the ages of 16 and 30. The potential impact of post-compulsory education and of work on skill level are explored further in the remaining sections of this chapter.

[2] England and Northern Ireland were the only jurisdictions in the UK who participated in the Survey of Adult Skills and their data is combined in the international report to give a UK result.

It is important to note that upper secondary qualifications are gained at an earlier in the UK, e.g. at age 16, rather than at age 17-18 in other countries. In Fig 3.1 many 16-17 year-olds in the other three countries have not yet completed upper secondary education and so the adjustment for educational attainment will tend to boost their scores (relative to those shown in Fig 2.1). However, as many UK 16-17 year-olds have already attained upper secondary qualifications the education adjustment does not boost their relative scores.

3.1 Skills level and additional years of education

As an alternative to comparisons by ISCED (International Standard Classification of Education) level, it is possible to make comparisons between participants in the Survey of Adult Skills by years of education. This variable is derived from respondent's highest qualification and converted to years of schooling using information from participating countries about the usual number of years of education required to complete each qualification. This is, therefore, quite a crude variable and most useful when making comparisons internationally when ISCED may hide information. For instance, when looking at the difference between GCSEs and A levels (which are the same ISCED level) compared with qualifications in other countries. The number of years spent in education in England does not provide a good explanation for differences in proficiency amongst the working population. The data in appendix Figure A5 shows that while adults with 11 years of education (those who left school directly at the end of compulsory education with GCSE or equivalent qualifications) have lower skill levels than adults who continued for at least one additional year, the skill levels of those with 12 years' education or more are similar. Therefore, it is continuing beyond GCSE (or equivalent) that is related to higher levels of skills, rather than how much additional education is completed, although the causal direction of this relationship is not demonstrated by the data.

3.2 Skills level and employment

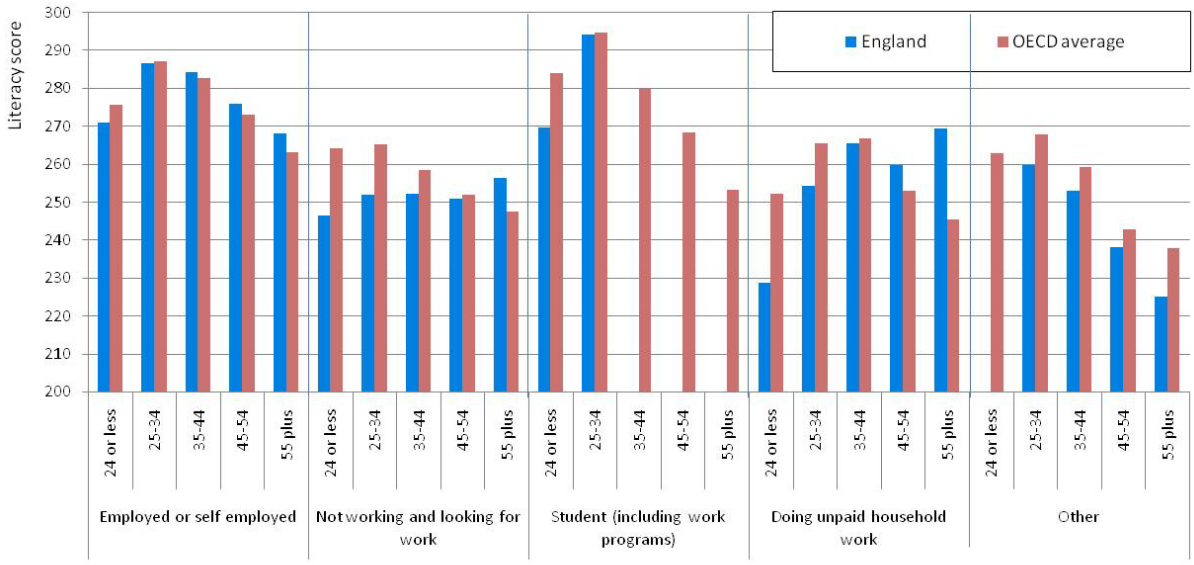
Appendix Tables A1 and A2 show the literacy and numeracy levels by employment status and age band for adults in England. Their mean score is compared to the average for each subgroup across participating OECD countries, and significant differences are noted.

3.2.1 Distribution of each 10-year age band by employment status

The proportion of each age group with each employment status generally varies as would be expected given the stage of life that the adults are at. For instance, the proportion of adults aged 16-24 who are employed or self-employed is much lower than adults in all other age groups and a large proportion of 16-24 year olds are still in education or work programmes. However, adults aged 16-24 had the largest proportion of all the age bands who were not working and looking for work, indicating that unemployment is a problem amongst young adults in England.

The mean literacy scores for each group of adults (by employment status and age band) are presented in the figure below. Appendix figure A6 shows that numeracy scores displayed similar patterns across sub-groups although average scores tended to be lower in each (in England and on average across all countries).

Figure 3.2 Average literacy scores in England and on average across participating OECD countries, by age and employment status



Source: Survey of Adult Skills (2012). Note: Bars are not included where the sample size for the group report is less than 30.

3.2.2 Literacy and numeracy level of adults employed or self employed

The mean scores of adults in employment were similar to the average across participating OECD countries for each age band in literacy. In numeracy, adults aged 25-34 and 45-54 in England were significantly below the average across participating OECD countries, but other age groups were not significantly different.

3.2.3 Literacy and numeracy level of adults not working and looking for work

Young adults (aged 16-34) who were not working and looking for work in England have substantially and significantly lower literacy and numeracy skills, on average, than young adults not working and looking for work in the other participating countries. The skill levels of older adults out of work in England are not significantly different from the average in other participating OECD countries. The average literacy and numeracy skills of adults out of work are similar across all age bands in England (although those aged 55+ have slightly higher skills), indicating that adults at this skill level in England are unlikely to be in work, irrespective of age.

3.2.4 Literacy and numeracy level of adults in education, including work programmes

The vast majority of adults in education or work programmes in England are aged 16-24. These students in England have similar literacy and numeracy skills, on average, when compared with peers of a similar age in England who are in employment. However, relative to students of this age across other countries, students in England aged 16-24 have relatively low literacy and numeracy skills. In contrast, adults aged 25-34 in education or work based programmes in England achieved substantially higher average scores in literacy and numeracy (although based on a small sample, so the findings should be treated with caution)– on a par with their peers in other countries.

These findings suggest that while post-compulsory education is related to higher levels of literacy within England, students aged 16-24 in further education courses, work based study programmes, or taking first degrees in England have significantly lower skills, on average, than their peers in other countries. However, those who continue with higher education courses, or start these later, are more on a par with their peers in other countries. The proportions of adults in this employment group for all other age bands was very small and so further comparisons are not useful.

3.2.5 Literacy and numeracy level of adults doing unpaid household work

Young adults (16-24) doing unpaid household work in England have the lowest literacy and numeracy scores, on average, of any employment group. The same is also true in other countries, however the average scores in England are substantially lower. The opposite is true at the other end of the age range, where adults aged 55+ doing unpaid household work in England have significantly higher average scores than adults in the same employment group in other countries.

3.3 Skills level and skills use

Literacy and numeracy scores by selected skill use at work for each 10-year age band are shown in appendix Table A3. The skill use and domains considered are literacy scores with reading at work, numeracy scores with numeracy at work, and literacy and numeracy scores with learning at work. Each skill index provides a measure of how often the tasks making up the index were carried out by a participant. Respondents who answered 'Never' to all questions in the index appear in an 'All zero response' category. The remaining respondents' answers to the questions were analysed using Item Response Theory (IRT) to produce the index. Internationally, these participants were grouped into quintiles which give an indication of how often they perform these tasks. For instance, participants who fall in the lowest 20 per cent on the index internationally will tend to perform some or all of the tasks infrequently, whereas participants who fall in the 'more than 80 per cent' group will frequently perform many of the tasks. Further details about how the indices are created are given in Chapter 4 of the international report (OECD, 2013b), the reader companion (OECD, 2013c) and Chapter 20 of the technical report (OECD, 2013d).

In general, for each skill index, there is a correlation between increased use of skill and better performance in literacy and numeracy. When the skill indices are analysed by 10-year age bands, there are some differences in the correlation for adults aged 16-24 compared with adults in other age bands. For instance, reading at work has little relationship with literacy proficiency. Young adults who never carried out reading at work activities had the lowest literacy scores amongst young adults, as with other age bands, but young adults who read with low or high frequency at work scored very similarly in literacy, which was different from the pattern for the older age groups, where there were large gains in literacy score between adults that read with low and moderate frequency in work. The pattern of performance in numeracy with numeracy skills at work was similar to that for literacy with reading at work.

In comparison, young adults' literacy and numeracy skills had a stronger relationship with the frequency of reported learning at work than adults in older age groups, which showed little relationship. Adults that reported low to moderate levels of learning at work in the youngest age group had a much stronger relationship with achievement in literacy and numeracy than adults in other age groups. That is, young adults who reported little

learning at work scored substantially lower than those who reported higher frequencies of learning at work. In addition, the group of young adults who reported a low frequency of learning at work had much lower scores in literacy and numeracy than those who reported little use of reading or numeracy skills at work.

4. Conclusions

Comparison with other international surveys shows that the pattern of age-related improvement by young adults in England is relatively unusual internationally, although in most countries in 2012 literacy peaked at around age 30. Comparing the effects of ageing and of generations of adults who were assessed in the Survey of Adult Skills and IALS or PISA does not suggest that the poor performance of young adults is due to a decline in standards of education in England and does support the theory that young adults in England leave formal schooling with relatively low skill levels but develop their skills in literacy and numeracy particularly during their twenties and thirties. Analysis of the relationship between skill level and years of education suggests that continuing beyond GCSE is related to higher literacy skills. It is also positive that young adults do rapidly develop skills in literacy and numeracy during their early working lives and that they enter the world of work ready to learn. However, it is important to further understand what it is about other countries' education systems that seemingly provide their young adults with higher literacy and numeracy skills as they enter the world of work.

Although on average young adults in England performed less well than their counterparts in other participating countries in literacy and numeracy, young adults in England who were in employment had literacy and numeracy scores not significantly different from the average of OECD participating countries. However, young adults in education and work programmes were significantly below this international average. While young people's literacy level and improvement is limited relative to other countries, the PISA comparison with the Survey of Adult Skills indicates some improvement between 18 and 21 within England. People's skills seem to improve more rapidly in their twenties, with 25-34 year olds in England being similarly skilled to counterparts in other countries. This suggests that a combination of continuing beyond compulsory education and entering the world of work help raise young people in England's skill levels in literacy and numeracy to around the average of participating OECD countries.

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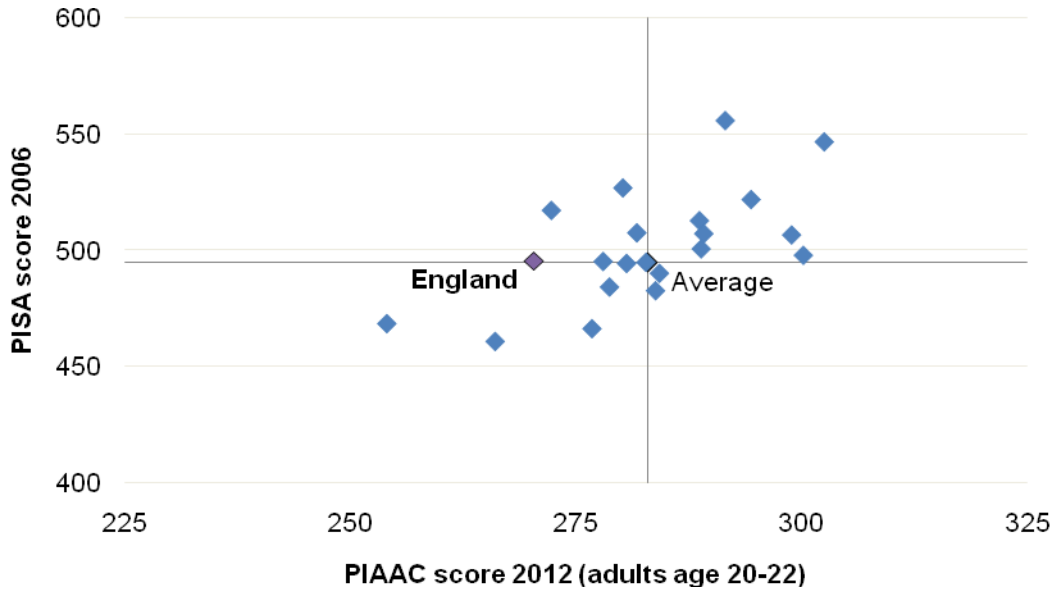
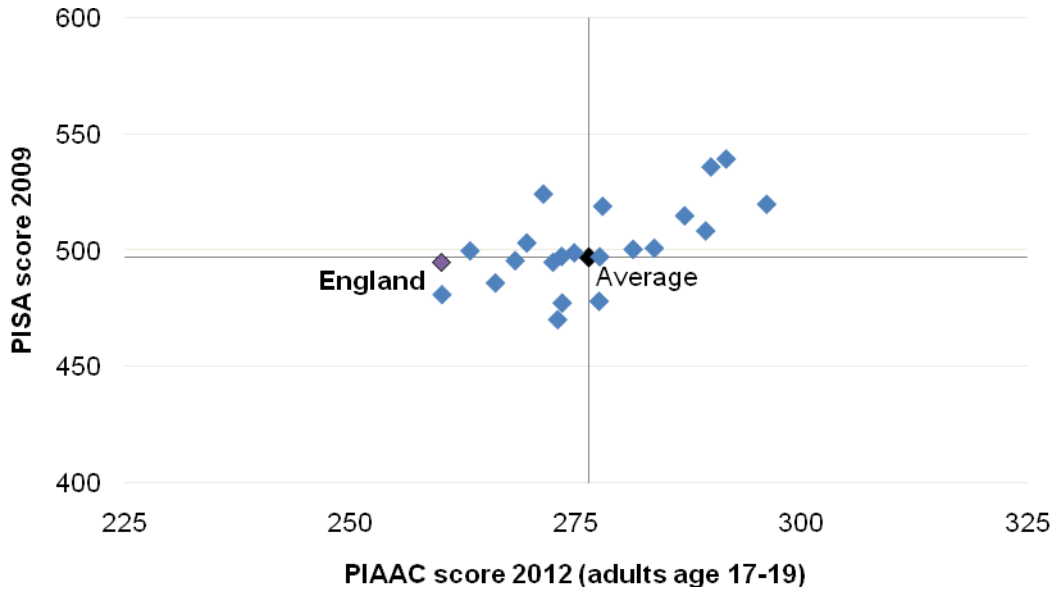
Appendix

Figure A1 Mean reading score in PISA 2006 and literacy score in the Survey of Adult Skills 2012, 20-22 year-olds



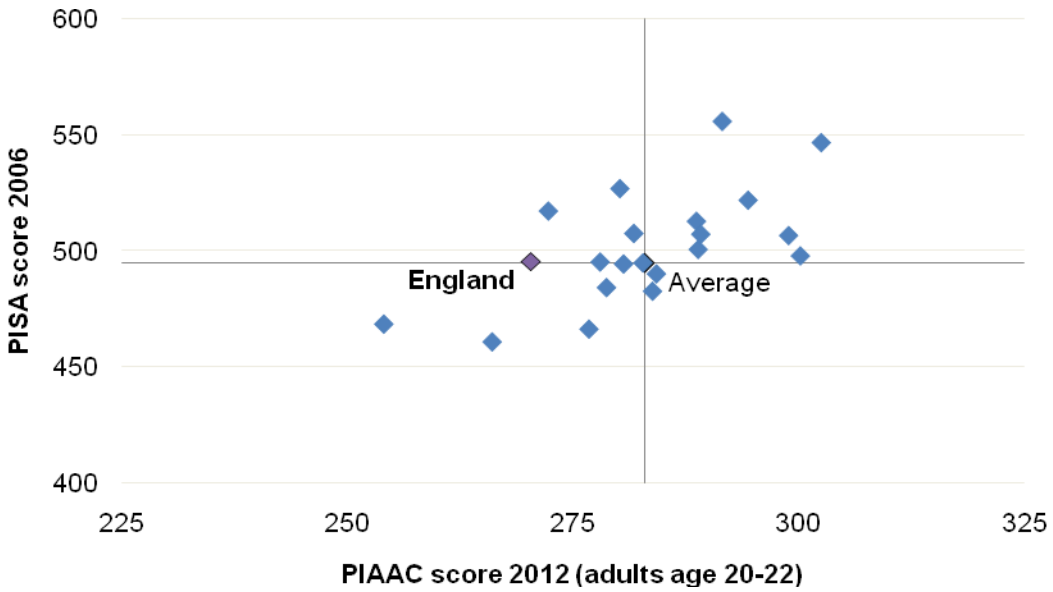
Note: the black diamond is the overall average for PISA / PIAAC. Source: Survey of Adult Skills (2012)

Figure A2 Mean reading score in PISA 2009 and literacy score in the Survey of Adult Skills 2012, 17-19 year-olds



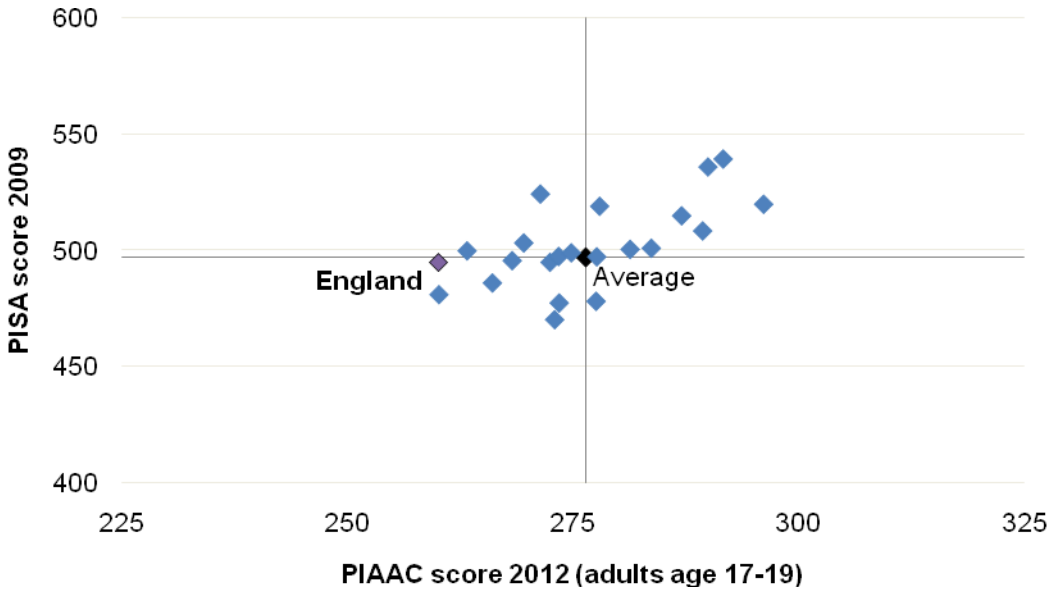
Note: the black diamond is the overall average for PISA / PIAAC. Source: Survey of Adult Skills (2012)

Figure A3 Mean mathematics score in PISA 2006 and numeracy score in the Survey of Adult Skills 2012, 20-22 year-olds



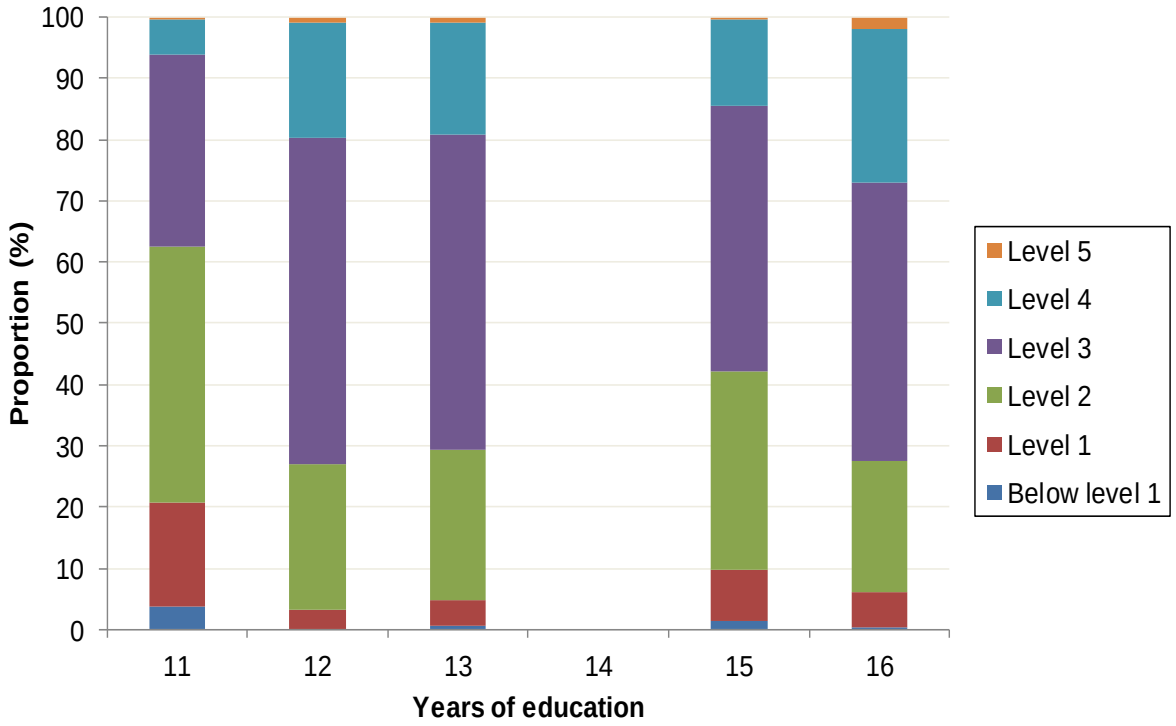
Note: the black diamond is the overall average for PISA / PIAAC. Source: Survey of Adult Skills (2012)

Figure A4 Mean mathematics score in PISA 2009 and numeracy score in the Survey of Adult Skills 2012, 17-19 year-olds



Note: the black diamond is the overall average for PISA / PIAAC. Source: Survey of Adult Skills (2012)

Figure A5 Literacy skill PIAAC levels by years of education for 16-65 year-olds in England



Note: 14 shows as a blank due to the way the data is coded using level of qualification as a proxy for years of education. Source: Survey of Adult Skills (2012). Completing 11 years of education is equivalent to leaving school directly after compulsory education (i.e. GCSE or equivalent).

Table A1 Literacy level in England by employment status for 10-year age bands (per cent)

	Age	Proportion	Below L1	L1	L2	L3	L4	L5	Mean		S.E.	N	OECD average	S.E.
Employed or self employed	24 or less	41.0	2.1	11.3	39.6	37.6	8.8	0.7	271.0		(3.0)	294	275.7	(0.7)
	25-34	75.6	1.7	8.3	27.9	42.2	18.5	1.4	286.8		(2.3)	766	287.3	(0.4)
	35-44	79.4	2.1	9.1	28.6	40.9	18.1	1.2	284.3		(1.8)	873	282.8	(0.4)
	45-54	80.4	2.0	12.7	32.3	39.1	13.0	0.8	276.0		(2.0)	829	273.2	(0.4)
	55 plus	53.7	3.4	13.4	38.8	33.9	9.9	0.7	268.2		(2.7)	577	263.3	(0.5)
Not working and looking for work	24 or less	11.5	7.8	22.3	42.8	21.7	5.5	0.0	246.6	*	(6.4)	95	264.3	(1.4)
	25-34	8.3	8.2	22.4	38.3	23.6	7.4	0.1	252.0	*	(6.3)	100	265.3	(1.5)
	35-44	6.4	4.8	25.0	40.5	22.8	6.4	0.4	252.3		(7.1)	84	258.6	(1.5)
	45-54	6.5	8.7	22.8	33.4	26.1	8.7	0.4	251.1		(8.1)	81	252.1	(1.7)
	55 plus	4.5	4.4	19.4	45.9	21.2	9.1	0.1	256.4		(6.8)	54	247.7	(1.7)
Student (including work programs)	24 or less	41.5	2.9	15.1	33.3	39.6	9.1	0.1	269.8	*	(4.3)	230	284.1	(0.5)
	25-34	3.1	0.5	10.6	27.3	29.1	26.5	5.9	294.4		(14.7)	32	294.9	(2.1)
	35-44	c	c	c	c	c	c	c	c		c	14	280.2	(4.6)
	45-54	c	c	c	c	c	c	c	c		c	6	268.5	(4.4)
	55 plus	c	c	c	c	c	c	c	c		c	3	253.5	(7.4)
Doing unpaid household work	24 or less	4.2	11.2	32.8	42.4	13.6	0.0	0.0	229.0	*	(9.0)	47	252.3	(3.3)
	25-34	9.6	8.2	20.7	34.6	28.9	7.5	0.1	254.3		(6.1)	127	265.5	(1.5)
	35-44	9.0	4.1	16.1	34.7	33.4	11.6	0.2	265.7		(6.2)	109	266.9	(1.9)
	45-54	4.6	3.0	17.7	47.3	22.8	8.6	0.7	260.0		(7.7)	58	253.0	(3.6)
	55 plus	4.0	5.3	9.2	31.3	45.9	8.3	0.0	269.5	*	(8.5)	40	245.5	(2.1)
Other	24 or less	c	c	c	c	c	c	c	c		c	16	262.9	(2.8)
	25-34	3.5	8.9	19.5	31.7	23.1	15.4	1.4	259.9		(12.4)	35	267.9	(2.3)
	35-44	4.0	8.5	21.5	33.3	27.6	8.9	0.1	253.0		(7.7)	54	259.5	(1.9)
	45-54	6.4	12.3	29.1	34.4	19.9	4.3	0.1	238.3		(6.7)	88	242.9	(1.7)
	55 plus	7.8	15.2	31.4	38.5	14.1	0.8	0.0	225.2	*	(5.2)	102	238.1	(1.6)

Source: Survey of Adult Skills (2012) S.E. standard error N number of cases (unweighted) * significantly different from average of participating OECD countries at five per cent level c less than 30 cases

Table A2 Numeracy level in England by employment status for 10-year age bands (per cent)

	Age	Proportion	Below L1	L1	L2	L3	L4	L5	Mean	SE		N	OECD average	SE
Employed or self employed	24 or less	41.0	2.6	16.9	41.6	30.3	8.1	0.5	263.3	(3.3)		294	268.7	(0.7)
	25-34	75.6	4.1	12.3	29.5	37.9	14.7	1.5	276.0	(2.5)	*	766	283.8	(0.5)
	35-44	79.4	3.1	12.8	32.1	34.9	15.5	1.5	276.6	(2.0)		873	280.1	(0.4)
	45-54	80.4	4.4	18.9	32.5	32.7	10.3	1.2	265.4	(2.1)	*	829	271.6	(0.4)
	55 plus	53.7	5.2	16.3	38.7	29.7	9.5	0.6	262.2	(2.6)		577	261.8	(0.6)
Not working and looking for work	24 or less	11.5	12.2	30.8	37.0	16.2	3.4	0.3	232.9	(6.4)	*	95	252.5	(1.5)
	25-34	8.3	13.7	30.1	34.6	17.5	3.8	0.2	232.5	(6.5)	*	100	254.8	(1.6)
	35-44	6.4	17.7	25.5	31.4	21.5	3.4	0.4	233.8	(9.1)		84	248.2	(1.7)
	45-54	6.5	18.7	25.2	27.6	18.6	9.4	0.4	233.8	(8.9)		81	243.3	(1.8)
	55 plus	4.5	9.7	27.0	33.9	22.0	7.2	0.2	246.9	(7.9)		54	240.6	(1.8)
Student (including work programs)	24 or less	41.5	4.3	19.2	35.3	32.4	8.6	0.2	261.9	(4.4)	*	230	275.9	(0.6)
	25-34	3.1	3.5	13.5	32.9	19.3	22.4	8.5	285.1	(18.1)		32	289.8	(2.2)
	35-44	c	c	c	c	c	c	c	c	c		14	271.7	(5.0)
	45-54	c	c	c	c	c	c	c	c	c		6	262.6	(5.3)
	55 plus	c	c	c	c	c	c	c	c	c		3	251.2	(8.5)
Doing unpaid household work	24 or less	4.2	23.9	34.8	38.4	2.8	0.0	0.0	208.3	(10.9)	*	47	237.4	(3.6)
	25-34	9.6	21.2	26.1	31.1	18.7	2.9	0.0	225.6	(7.4)	*	127	253.8	(1.5)
	35-44	9.0	13.2	24.1	34.0	21.6	7.0	0.0	241.8	(6.9)		109	254.3	(2.1)
	45-54	4.6	12.2	25.4	45.0	11.9	5.4	0.1	235.9	(8.6)		58	238.8	(3.8)
	55 plus	4.0	11.0	15.9	37.7	29.6	5.8	0.0	248.8	(10.8)		40	233.8	(2.4)
Other	24 or less	c	c	c	c	c	c	c	c	c		16	253.3	(3.1)
	25-34	3.5	14.4	26.0	24.6	24.0	10.7	0.3	244.3	(13.7)		35	257.0	(2.5)
	35-44	4.0	17.0	24.4	33.1	17.4	7.1	1.0	236.1	(8.4)		54	250.8	(2.2)
	45-54	6.4	24.6	32.2	24.3	16.6	2.3	0.0	218.1	(7.2)	*	88	233.6	(1.8)
	55 plus	7.8	25.1	36.3	28.9	8.7	1.0	0.0	208.1	(5.4)	*	102	230.5	(1.6)

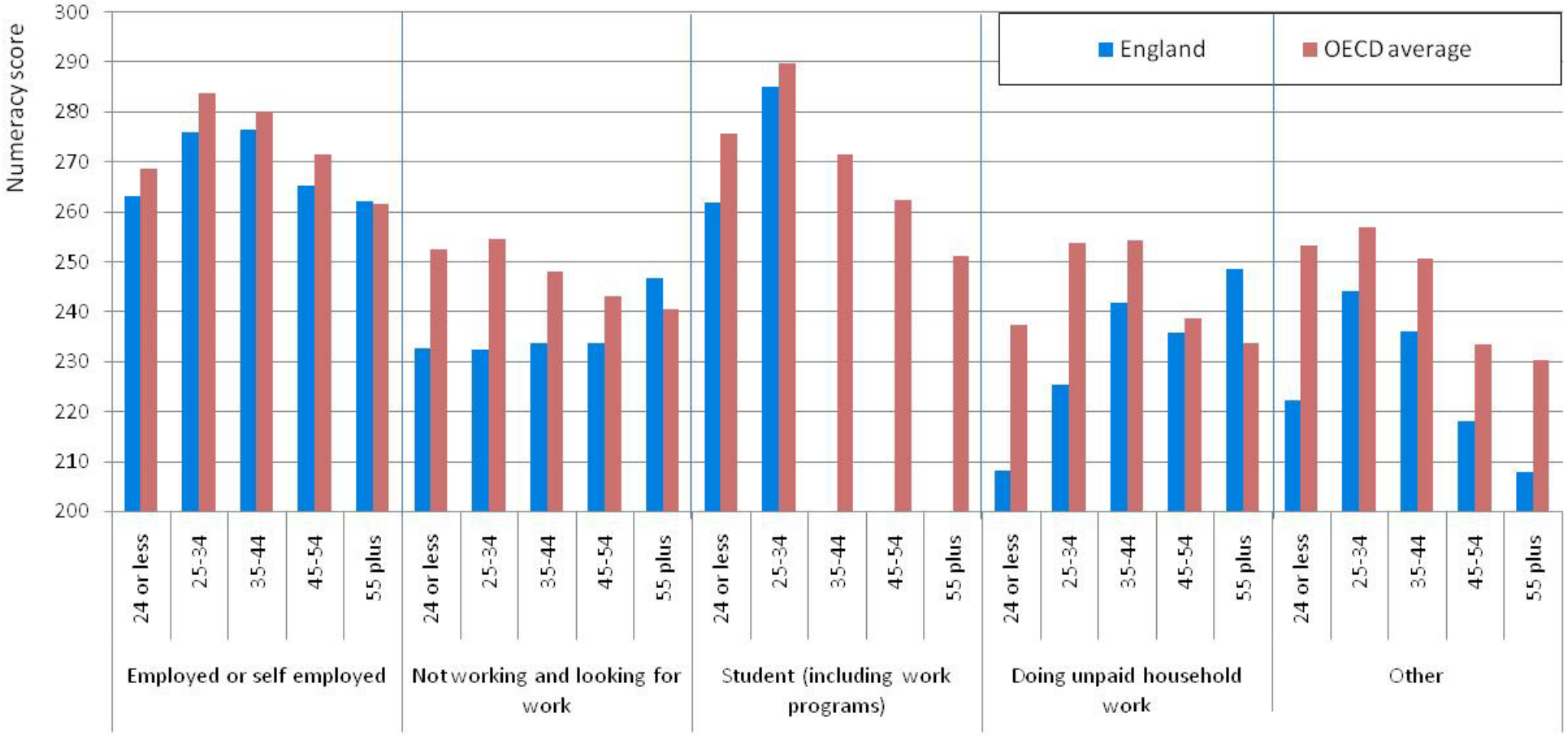
Source: Survey of Adult Skills (2012) S.E. standard error N number of cases (unweighted) * significantly different from average of participating OECD countries at five per cent level c less than 30 cases

Table A3 Mean literacy and numeracy score in England by skill use at work for each 10-year age band

Age	All zero response		Lowest to 20%		More than 20% to 40%		More than 40% to 60%		More than 60% to 80%		More than 80%	
	Average	S.E.	Average	S.E.	Average	S.E.	Average	S.E.	Average	S.E.	Average	S.E.
Literacy - Reading at Work												
24 or less	250.6	(9.5)	271.2	(5.5)	271.7	(5.3)	279.2	(5.5)	271.5	(10.7)	276.1	(9.4)
25-34	c	c	248.5	(6.6)	278.1	(4.5)	290.6	(4.4)	302.0	(3.9)	299.5	(4.4)
35-44	c	c	256.6	(7.0)	272.8	(4.2)	284.6	(3.2)	294.0	(3.8)	296.1	(3.3)
45-54	c	c	252.1	(4.5)	260.8	(4.0)	284.3	(4.3)	290.5	(4.0)	288.4	(3.5)
55 plus	c	c	248.5	(6.0)	260.4	(4.4)	280.6	(4.5)	282.4	(5.2)	282.8	(4.6)
Numeracy - Numeracy at Work												
24 or less	244.0	(6.4	262.2	(6.8)	270.8	(6.5)	268.1	(5.8)	271.6	(5.6)	273.7	(10.1)
25-34	235.8	(6.3	266.9	(4.7)	277.7	(6.0)	280.0	(5.7)	292.0	(4.5)	289.9	(4.9)
35-44	240.4	(5.2	272.5	(5.0)	269.6	(6.0)	278.1	(4.4)	288.8	(4.3)	297.2	(4.6)
45-54	229.2	(4.4	263.6	(4.6)	260.9	(5.8)	282.0	(4.5)	275.2	(4.7)	290.9	(4.5)
55 plus	233.2	(6.1	255.6	(4.6)	264.4	(6.8)	272.6	(5.2)	282.5	(4.3)	297.7	(6.1)
Literacy - Learning at Work												
24 or less	c	c	241.6	(10.8)	267.3	(6.8)	276.6	(4.9)	280.7	(5.9)	274.7	(4.6)
25-34	c	c	286.5	(5.7)	292.8	(5.3)	293.6	(4.1)	289.9	(5.4)	288.7	(4.1)
35-44	c	c	287.3	(3.9)	289.6	(4.4)	287.5	(4.7)	290.8	(4.1)	275.9	(4.5)
45-54	c	c	269.7	(4.4)	280.6	(4.5)	287.1	(4.5)	275.2	(4.5)	268.6	(4.7)
55 plus	c	c	268.9	(5.6)	276.5	(5.6)	271.2	(6.1)	267.9	(5.9)	268.0	(6.4)
Numeracy - Learning at Work												
24 or less	c	c	234.1	(11.7)	259.7	(7.6)	271.7	(5.4)	271.1	(5.6)	263.6	(5.1)
25-34	c	c	276.9	(5.7)	284.4	(7.1)	279.4	(5.2)	283.2	(6.1)	278.4	(4.2)
35-44	c	c	279.5	(4.7)	282.0	(5.2)	277.4	(5.2)	286.0	(4.5)	267.4	(5.4)
45-54	c	c	262.1	(4.9)	273.2	(4.6)	275.7	(4.7)	263.3	(4.9)	254.4	(5.6)
55 plus	c	c	262.7	(5.8)	271.2	(5.8)	264.7	(6.6)	262.1	(6.1)	268.0	(8.2)

Source: Survey of Adult Skills (2012) S.E. standard error c less than 30 cases

Figure A6 Average numeracy scores in England and on average across participating OECD countries, by age and employment status



Source: Survey of Adult Skills (2012)

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